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APPLICATION

FOR

UNITED STATES LETTERS PATENT

TITLE: POUCH

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POUCH

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims priority from U.S. provisional application number 60/406,660, filed August 29, 2002.

BACKGROUND OF INVENTION

[0002] This invention relates to a flexible plastic pouch containing a flowable product, such as a fluid.

[0003] Products may be packaged in flexible pouches as it minimizes the use of packaging material. However, where the product is flowable (such as a granulated product or a liquid), it may be advantageous to design the pouch so that it is self-standing.

[0004] It is known to produce a self-standing flexible pouch by utilising additional layers of packaging material, as, for example by gussetting the base of the pouch. This, however, increases the use of packaging material and manufacturing complexity. In another approach, after establishing seals to form the basic pouch, cross-seals are formed in a secondary operation to make the pouch self-standing. For example, in US6,164,042 to Tobolka, after sealing two sheets of plastic material together to form a liquid filled pouch, the bottom corners of the pouch are pinched flat to form triangular portions. A heat seal is then made along the base of the triangular portions and these triangular portions are then removed. This creates a rectangular base for supporting the pouch in a stand-up position. However, this intrusion into the previously formed pouch in order to form the triangular portions risks interfering with the integrity of the pouch.

[0005] A need remains for a robust self-standing pouch which is of simple manufacture.

SUMMARY OF INVENTION

[0006] In the present invention, the bottom portion of a flexible pouch is configured such that it collapses when on a flat surface to form a stable basal platform for the pouch.

[0007] According to the present invention, there is provided a flexible pouch, filled with a flowable product having a front pouch wall joined to a rear pouch wall along opposite side edges and along a bottom edge. The front pouch wall, when flat, has a first width at a first level above the bottom edge and concave or oblique opposite sides between the first level and the bottom edge so that a width of the front pouch wall progressively decreases below the first level, at least down to a second level. In consequence, when the pouch is set down with the bottom edge on a flat surface, the sides between the first level and the bottom edge collapse to provide a stable basal platform for the pouch.

[0008] Other features and advantages of the invention will become apparent from a review of the following description in conjunction with the figures.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] In the figures which disclose example embodiments of the invention,

FIG. 1 is a perspective view of a pouch filled with a flowable product made in accordance with this invention,

FIG. 2 is a front view of the pouch of **FIG. 1**,

FIG. 3 is a front view of the pouch of **FIG. 1**, when empty,

FIG. 4 is a cut-away view showing a portion of the pouch of **FIG. 1** during a pouch opening operation,

FIG. 5 is a perspective view of the pouch of **FIG. 1** in a second configuration,

FIG. 6 is a schematic view of a folded plastic sheet illustrating the front wall of the pouch of **FIG. 1**,

FIG. 7 is a schematic view of a folded plastic sheet illustrating formation of a series of pouches of the type illustrated in **FIG. 1**, and

FIGS. 8 to **15** are front views of empty pouches made in accordance with further embodiments of this invention.

DETAILED DESCRIPTION

[0010] Referring to **FIGS. 1** and **2**, a pouch **20** made in accordance with this invention has a front pouch wall **22** joined to a rear pouch wall **23** (**FIG. 5**) along opposite side edges **24**, **26**, along a top edge **30**, and along a bottom edge **32**. The pouch walls are made of a flexible material, such as plastic, and the pouch is filled with a flowable product, such as a fluid (e.g., yoghurt or water.

[0011] The front pouch wall may be joined to the rear pouch wall at side edges **24**, **26** by sealing the walls together at these edges. This forms a sealed band **34** along the side edges. Similarly, the front and rear pouch walls may be joined to each other at one or both of the top and bottom edges by sealing these walls together. As illustrated in **FIGS. 1** and **2**, the front and rear walls are sealed together at the top edge **30**. On the other hand, the front and rear walls are joined at the bottom edge **32** by virtue of the flexible material from which the pouch is constructed being integral at the bottom edge.

[0012] Because the pouch **20** is flexible and filled with a flowable product, the configuration of the pouch differs depending upon which portion of the pouch rests on a supporting surface. As illustrated in **FIGS. 1** and **2**, the pouch is resting on the pouch rear wall **23** (**FIG. 5**).

[0013] With the flexible pouch resting on its rear pouch wall **23**, the front pouch wall **22** is substantially flat. In this configuration, with specific reference to **FIG. 2**, the front pouch wall has a maximum width at a first level **L1** above the bottom edge **32** and concave opposite sides **24b**, **26b** between the first level **L1** and the bottom edge **32**. In consequence, the width of the front pouch wall **22** progressively decreases below the first level **L1** down to a second level, **L2**. In fact, the side edges **24b**, **26b** form an inwardly directed corner **28** at the second level **L2**. The flowable product in the pouch causes the pouch to bulge, thus, the true shape of the front pouch wall **22** will only be apparent when the pouch is empty.

[0014] **FIG. 3** illustrates, in front view, an empty pouch **20'** such that the front pouch wall **22** is flat. From **FIG. 3**, it will be apparent that the concave opposite sides **24b**, **26b** between the first level **L1** and the bottom edge **32** of the pouch trace arcs of a circle. The radius, **r**, of these arcs may be less than 1.5" (3.8 cm). The distance, **x**, between the first level **L1** and the bottom edge **32** of the pouch **20'** may be about 27% to 30% of the width, **W**, of the pouch at the first level, **L1**. Furthermore, a distance, **y**, measured along said first level, between a corner **38** of the front pouch wall **22** at level L1 and a corner **40** where the side **24b** or **26b** meets the bottom edge **32**, is about, is about 65% to 70% of the distance **x**. By comparing **FIG. 3** with **FIG. 2**, it will be apparent that with the pouch filled, the radius of the sides **24b**, **26b** breaks to form the afore-referenced inwardly directed corner **28**. This break point is predictably located. Consequently, with the radius, r, the same for both sides **24b**, **26b**, this pouch configuration facilitates achieving a vertical orientation for the pouch when stood up.

[0015] As is apparent from **FIGS. 1** to **3**, the pouch has a narrow neck **44** and an enlarged head **46**. The neck meets the head at a corner **48** so as to provide a tear point which, as illustrated in **FIG. 4**, facilitates separation of the head from the neck in order to open the pouch. Optionally or additionally, the pouch may be provided with a notch **50** to facilitate tearing the neck of the pouch at this notch. With reference to **FIG. 3**, for reasons which will become apparent, the sides **24t**, **26t** at the head **46** are mirror images of the sides **24b**, **26b** at the base between level **L1** and the bottom edge **32**. Thus, the head **46** has convex opposite sides **24t**, **26t** such that a width of the front pouch wall progressively increases above the neck **44** and defines the same dimensions, **x, y,** and **r**, as are defined at the base of the pouch.

[0016] If the filled pouch **20** of **FIG. 1** is lifted up and set down on a flat surface bottom edge first, the sides **24b**, **26b** between the first level **L1** and the bottom edge **32** collapse under the weight of the overlying portions of the pouch to provide a stable basal platform for the pouch. **FIG. 5** illustrates the pouch in this configuration. Referring to **FIG. 5**, it will be apparent that as the pouch is set down, the sides **24b**, **26b** fold at corners **28**. Further, the bottom edge flattens. The result is a flat basal platform **52** with a hexagonal perimeter and a self-standing pouch.

[0017] Because each corner **28** is predictably located, being a function of the radius, **r** (**FIG. 3**), with the radius **r** the same for both sides **24b**, **26b**, this pouch configuration facilitates achieving a vertical orientation for the pouch when stood up.

[0018] Turning to **FIG. 6**, the pouch may be manufactured from a folded plastic sheet **56** utilising curved heat sealing bars (not shown) which seal the sheet at sides **24**, **26** and top **30**. The bottom edge **32** naturally results from the fold in the sheet **56**. With reference to **FIG. 7**, sheet material may be conserved by alternately orienting and nesting adjacent pouches **20** that are formed in the sheet **56**. It is with this approach to forming the pouches **20** that the sides **24t**, **26t** of the neck are mirror images of the sides **24b**, **26b** at the bottom of the pouch. Furthermore, with this approach, where one pouch has a top seal **30** and a bottom edge naturally resulting from the fold in the sheet, the adjacent pouch formed from the sheet **56** will have a bottom seal and a top edge naturally resulting from the fold in the sheet.

[0019] One convenient manner of forming pouches **20** is to use vertical form, fill, and seal technology. With this approach, a sheet is folded around a product supply pipe and free side edges of the folded sheet are sealed together to form a vertical tube. A bottom seal is then formed in the tube and the tube partially filled with flowable product. Heat sealing bars may then press together to displace the flowable product and form successive pouches which may be cut from the tube. This approach to forming pouches is further described in US6,164,042 to Tobolka, the contents of which are incorporated herein by reference.

[0020] **FIGS. 8** through **12** illustrate, in front view, empty pouches **120'**, **220'**, **320'**, **420'**, **520'**, respectively, having different pouch configurations. Each of pouches **120'**, **220'**, **320'**, **420'**, **520'** may also suitably be formed from a folded plastic sheet in a nested fashion.

[0021] With specific reference to **FIG. 10**, empty pouch **320'** has oblique linear bottom sides **324b**, **326b** extending between level **L1** and the bottom edge **332** of the pouch. Thus, the width of the front pouch wall **22** progressively decreases below the first level (**L1** down to the bottom edge of the pouch. With this pouch configuration, when the pouch is full,

while the bottom sides **324b**, **326b** will break to form an inwardly directed corner, the location of this corner will not be predictably located (in contrast to the situation where the bottom sides are configured as arcs of a circle). Because of this, the pouch of **FIG. 10** might not stand vertically when set down, bottom edge first.

[0022] With specific reference to **FIG. 11**, pouch **420'**, bottom sides **424b** and **426b** have a first linear section **427** between the first level **L1** and a second level **L2a** and a second linear section **429** between the second level **L2a** and the bottom edge **432**. In consequence, the front pouch wall **422** is narrower at said second level **L2a** than at either the first level **L1** or the bottom edge **432**. The pouch of **FIG. 11**, when filled, will form a predictably positioned inwardly directed corner (between linear sections **427** and **429**). Consequently, this pouch configuration facilitates achieving a vertical orientation for the pouch when stood up.

[0023] The pouch of **FIG. 12** differs in that its neck portion **544** is off to one side rather than being centrally located.

[0024] **FIG. 13** illustrates, in front view, an empty pouch with yet another pouch configuration. With reference to **FIG. 13**, pouch **620'** has linear sides **624**, **626** above level **L1** and radially concave sides **624b**, **626b**. In consequence, pouch **620'** cannot be formed in a nested fashion as can the pouches of the previously described embodiments.

[0025] **FIG. 14** illustrates, in front view, an empty pouch with a further pouch configuration. With reference to **FIG. 14**, pouch **720'** has concave sides **724b**, **726b** which flare outwardly proximate the bottom edge **732** of the pouch. In consequence, the width, W, of the front wall **722** of the pouch at level **L1** is actually less than the width, **W2**, of the front wall at the bottom edge **732**. As a result of this configuration, when pouch **720'** is full, and set down, bottom edge first, the side walls **724b**, **726b** collapse leaving projecting tabs at the base of the pouch. If such tabs were considered somewhat unsightly, one of the other pouch configurations could be chosen.

[0026] **FIG. 15** illustrates, in front view, an empty pouch **820'** which has angulated, rather than curved, edges. Thus, pouch **820'** has straight edge sections **824**, **827**, **829**, **832**, **826**, **830** meeting adjacent edge sections at an angle.

[0027] Similar to the designs of a few of the previously referenced pouches, in the pouch **820'** of **FIG. 15**, the medial portion of the side edge sections **824**, **826** between the concave basal portions **824b**, **826b** and neck **844** are straight. In consequence, when the pouch contains a flowable product and is set down on its base, these medial side edge portions are vertically oriented. This results in the flowable product being displaced vertically upwardly as the pouch is set down, avoiding distortion of the sides of the pouch, which occur in certain of the other designs, such as pouch **220'** of **FIG. 9**.

[0028] If the pouches illustrated in **FIGS. 8** through **15** are made by the process described in conjunction with **FIGS. 6** and **7**, each pouch will have a sealed band along all but either its top edge or its bottom edge, with the front and back walls of the pouch being integral at the edge which is not sealed. By way of example only, the pouches of these figures have been shown in this way, with the pouches of **FIGS. 8** through **14** having sealed bands along all but their bottom edges and the pouch of **FIG. 15** having a sealed band along all but its top edge.

[0029] It will be apparent from the foregoing that it is the geometry of the pouch, interacting with the fluid dynamics in the pouch, that results in the flat base when the pouch is set down. There is no requirement for gussets or secondary cross-seals in order to gain the stand-up feature.

[0030] A further advantage of the described pouches is that they may be shipped flat (i.e., resting on their front or back wall as illustrated in **FIGS. 1** and **2**) to conserve space, without interference from the stand-up feature. Yet further, shipping the pouches flat will not damage the stand up feature, nor stress the .pouch (which could increase the incidence of leaking pouches).

[0031] Other advantages and modifications within the scope of the invention will be apparent to those skilled in the art and, therefore, the invention is defined in the claims.